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 Subject : Another Article Request
 Date : Tue, 1 Oct 2002 08:40:55 -0700

Hi Marty,

Here's another article request for you.

OCT 03 REC'D

Thank you and regards,

Charlene

Phy QC 176 A, A66

8. Femtosecond-pulse laser ablation of human corneas

INS 94-29 4721851 A9418-8760G-003 (PHA); B9409-7520C-006 (EEA) NDN- 083-0472-1851-1

Kautek, W. ; Mitterer, S.; Krüger, J. ; Husinsky, W.; Grabner, G.

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DOCUMENT TYPE- Journal paper**ISSN-** 0721-7250**CODEN-** APSFDB**CORPORATE AUTHOR-** Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany**PUBLICATION COUNTRY-** Germany**LANGUAGE-** English (DEF)

A femtosecond pulse laser in the visible spectral region shows promise as a potentially new powerful corneal sculpting tool. It combines the clinical and technical advantages of visible wavelengths with the high ablation quality observed with nanosecond-pulse excimer lasers at 193 nm. A femtosecond and a nanosecond dye laser with pulse durations of 300 fs and 7 ns, and centre wavelengths at 615 nm and 600 nm, respectively, both focused to an area of the order of $10/\text{sup } -5/ \text{ cm}/\text{sup } 2/$, have been applied to human corneal ablation. Nanosecond laser pulses caused substantial tissue disruption within a 30-100 μm range from the excision edge at all fluences above the ablation threshold of $F/\text{sub th}/$ approximately = $60 \text{ J cm}/\text{sup } -2/ (\text{l}/\text{sub th}/$ approximately = $9 \text{ GW cm}/\text{sup } -2/$. Completely different excisions are produced by the femtosecond-pulse laser : high quality ablations of the Bowman membrane and the stroma tissue characterised by damage zones of less than 0.5 μm were observed at all fluences above ablation threshold of $F/\text{sub th}/$ approximately = $1 \text{ J cm}/\text{sup } -2/$ or $\text{l}/\text{sub th}/$ approximately = $3 \text{ TW cm}/\text{sup } -2/ (3 \cdot 10/\text{sup } 12/ \text{ W cm}/\text{sup } -2/)$. The transparent cornea material can be forced to absorb ultrashort pulses of extremely high intensity. The fs laser generates its own absorption by a multiphoton absorption process.

DESCRIPTOR(S)- eye; laser applications in medicine**IDENTIFIER(S)-** corneal sculpting tool; damage zones; femtosecond-pulse laser ablation; human corneas; multiphoton absorption process; stroma tissue; tissue disruption; ultrashort pulses; visible spectral region; Bowman membrane; 193 to 615 nm; 300 fs; 7 ns**NUMERICAL DATA INDEXING-** wavelength 1.93E-07 to 6.15E-07 m; time 3.0E-13 s; time 7.0E-09 s**TREATMENT CODE-** TC-P; TC-X**SECTIONAL CLASSIFICATION CODE-** A8760G; A8770G; A8732; B7520C; B4360